Review Comments
Supplemental Groundwater Sampling Work Plan
Northwest Pipe Company Portland, Oregon ECSI #138
Dated December 18, 2015

Submitted January 13, 2016

Following are the United States Environmental Protection Agency's (EPA) comments on the document titled, Northwest Pipe Company (NW Pipe) Supplemental Groundwater Sampling and Data Evaluation Work Plan (Work Plan), dated December 2015 and prepared by CH2M for NW Pipe. This Work Plan was prepared to address Oregon Department of Environmental Quality (DEQ) and EPA's comments on the Northwest Pipe Company Remedial Investigation and Source Control Evaluation (RI/SCE), dated April 2015, and a teleconference with presentation by NW Pipe in November, 2015. EPA's comments on the Draft Final Report RI/SCE were submitted to DEQ on April, 2015. The site is located within the Burgard Industrial Park at address 12005 North Burgard Road, Portland, Oregon. The site is located at approximate River Mile 3.9 east (RM 3.9E) and listed by Oregon Department of Environmental Quality (ODEQ) as ECSI #138. EPA understands the objectives of the work to be completed under this Work Plan are to:

- Demonstrate plume stability or decreasing trend in concentration and natural attenuation of volatile organic compounds (VOCs) in groundwater
- Collect appropriate geochemical data and evaluate new and previous data to demonstrate natural reductive dechlorination of VOCs is occurring
- Confirm groundwater flow direction, horizontal hydraulic conductivity, and horizontal hydraulic gradient to demonstrate a stable plume and evaluate natural attenuation
- Evaluate VOC fate and transport using the BIOCHLOR model and compare modeling results to previous BIOCHLOR modeling in order to assess the results against the Portland Harbor (PH) Preliminary Remediation Goals (PRGs).

General Comments

1. One of the key objectives of the Work Plan is to evaluate the fate and transport of the VOC plume data from the proposed two sampling events using the BIOCHLOR model and compare the output of the model to the BIOCHLOR model from previous sampling events. The Work Plan states (Section 1.1) that the BIOCHLOR modeling from the 2005 event predicted groundwater discharge to the Willamette River at concentrations below the levels of concern. EPA has not reviewed the referenced report of this modeling effort prepared by CH2M in 2005 and, therefore, cannot evaluate or comment on the analysis. A copy of this report should be provided to EPA so that this analysis may be reviewed.

2. Additional groundwater monitoring beyond the two sampling events proposed in the Work Plan is necessary to statistically document time concentration trends. After the first two monitoring events, concentration data should be evaluated at each monitoring point as evidence for identifying whether the concentrations are decreasing, stable, or increasing.

3. The Work Plan states that well construction logs will be obtained for T4S1MW-22 and T4S1MW-03s to determine if groundwater from these wells is representative of samples taken from the shallow

aquifer. The Work Plan also states that if the wells are found to be non-conducive to collecting samples in the shallow aquifer, then DEQ will be informed. Due to the undefined VOC plume extent extending from the NW Pipe property downgradient onto the T4 property, sampling T4S1MW-22 and T4S1MW-03s is critical to the source control evaluation. An alternative plan should be in place in case these wells are not conducive to shallow aquifer testing so that the downgradient extent of the VOC plume can be confirmed and data can be collected to determine whether the plume is reaching the Willamette River.

Specific Comments

1. Page 1, Section 1.1, last paragraph - This Work Plan states that changes in concentrations of VOCs (both parent compounds and degradation products) suggest that VOCs are migrating onto the NW Pipe facility from an offsite area to the east-northeast. As stated in previous comments on the RI/SCE, EPA does not agree that there is sufficient data to support this determination. In the teleconference in November 2015, NW Pipe presented a groundwater contour map that showed that the gradient is essentially flat in the area between MW-05 and MW-06. Based on the low gradient, historic pooling of stormwater in this area, formerly unpaved areas in the area between MW-05 and MW-06, other transport processes may have resulted in VOC concentrations at MW-05. Changes in condition at the site, such as increasing and decreasing water levels, increased pooling and stormwater infiltration could cause contaminant migration leading to increased concentrations at MW-05. Lacking groundwater monitoring wells between MW-05 and the east-northeast end of the property, it is not possible to evaluate potential offsite contributions to the VOC plume at the NW Pipe property.

2. Page 2, Section 2.1, first paragraph – The criteria that the hydrogeologist will use to determine when well development is complete should be defined in this work plan.

3. Page 4, Section 2.3.2, second paragraph – The bulleted list of measurements to supplement biochemical indicators of anaerobic biodegradation measured in 2005 is missing carbon dioxide and methane. These constituents are needed to complete EPA's Technical Protocol for Evaluating Natural Attenuation worksheet. EPA recommends including all relevant constituents evaluated in the worksheet.

4. Page 4, Section 2.3.3, third paragraph – EPA recommends that sampling for the geochemical indicators be conducted during the wet and dry season sampling events to determine seasonal variation and potential effect on natural attenuation.

5. Page 5, Section 2.3.3, third paragraph – Text states that wells will be sampled in order from expected lowest concentrations to expected highest concentration to avoid cross contamination, with the following prescribed sequence: T4S1MW-03s, T4S1MW-22, MW-03, MW-01, MW-04, MW-06, and MW-05. Although PCE was slightly higher in concentration in MW-05 than MW-06 in 2007, the degradation products were much more elevated in MW-06 than MW-05, see table below:

VOCs	MW-05 (mg/L)	MW-06 (mg/L)
PCE	1.4	1.2
TCE	0.078	0.47
c-1,2-DCE	0.34	0.64
VC	0.00028	0.0031

The elevated degradation products in MW-06 vs. MW-05 indicates that MW-06 is more likely to induce cross over contamination if sampled first. Considering this, EPA recommends that the sample order be revised as follows: T4S1MW-03s, T4S1MW-22, MW-03, MW-01, MW-04, MW-05, and MW-06.

The order of work at each well is of greater importance for the non-sampling activities, including water level gauging, well development, and slug testing, which involve placement of non-dedicated equipment in the well. Water level gauging and well development should be conducted in the above sequence to minimize potential cross contamination.

6. Page 5, Section 2.3.3, third paragraph – EPA guidance recommends Teflon or Teflon-lined polyethylene tubing be used for collection of groundwater samples that include analysis of VOCs. Teflon prevents potential leaching of contaminants from the tubing into the sample that could cause interference with analytical procedures.

7. Page 5, Section 2.3.3, fifth paragraph – The text states that turbidity samples will be collected from the flow through chamber. The flow through cell for a multi-probe acts as a settling chamber and typically the turbidity is lower in the effluent than the influent. EPA recommends measuring turbidity at the influent of the flow-through cell rather than the effluent so that the sample turbidity is more representative of the groundwater being sampled.

8. Table 2 – The reporting limit for VOCs is listed as 0.5 µg/L with the exception of PCE, which has a reporting limit listed as 0.1 µg/L. Portland Harbor PRGs for PCE, TCE, and vinyl chloride (VC) are 0.2, 1.4, and 0.02 µg/L respectively. In 2007, VC in some wells were below the reporting limit of 1 µg/L; therefore, it is unclear if these wells were below the PRG. A more sensitive analytical method is targeted for PCE in this work plan to be able to report concentrations below the PRG, but not for VC. If there is a reason a more sensitive analytical method is not being used for VC, it needs to be stated in the text.

9. Page 8, Section 3.0, bullet 2 – Text states that the aquifer test data will be analyzed by the Bouwer and Rice method and, depending on the data distribution, may be supplemented with other methods. Earlier in the Work Plan, on Page 3, Section 2.2, last paragraph, the text states that the aquifer test will be analyzed by another standard method based on CH2M hydrogeologist's opinion. The text needs to state precisely what data distribution metric will trigger a switch from the Bouwer and Rice method to an alternative method and why.

Editorial Comments

1. Page 5, Section 2.3.3, third paragraph – Wells in text MW-01 through MW-06 do not match the labels in Figure 1 or from RI/SCE, MW-01 through MW-06. Please adjust label naming structure to be consistent.
2. Figure 1 – Well labels in figure T-4-MW-22 and T-4-MW-03s do not match labels in text of the Work Plan, T4S1MW-22 and T4S1MW-03s. Text or Figure labels should be adjusted to match.